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FEASIBILITY STUDY WORK PLAN

MILLINGTON SITE
MORRIS COUNTY, NJ

Prepared for:

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FEASIBILITY STUDY WORK PLAN - MILLINGTON SITE

INTRODUCTION

Fred C. Hart Associates, Inc. (HART) was retained by National Gypsum Company of Dallas, Texas to conduct a Remedial Investigation/Feasibility Study of four sites in Morris County, NJ. The sites are next to or close by a former National Gypsum Plant in Millington, NJ where the company produced asbestos roofing and siding between 1955 and 1975.

The purpose of this investigation was to define the presence and extent of asbestos and other contaminants of concern, if any, on the sites. Within the scope of work for this project, however, the Millington site (where the former National Gypsum Plant was located) will be the only site reviewed.

The asbestos waste products are present within the Millington site as either part of an asbestos waste mound or subsurface asbestos fill deposit. The asbestos waste mound is located in the western sector of the site along the Passaic River. It is composed solely of loose asbestos fibers and is approximately 330 feet long, 75 feet wide and 26-30 feet thick. The subsurface asbestos fill deposit is present throughout the site and consists of broken asbestos tiles and siding that is intermixed with asbestos fiber. This deposit lies at the surface of the site and is 7 to 14 feet thick.

The Millington Site is located in southeastern Morris County, within the Piedmont Physiographic Province. It lies in a distant topographic and hydrologic region that occupies a little more than one quarter of the Passaic River Basin. The bedrock in this part of the Piedmont Province is composed of Mesozoic Formations of early Jurassic age. Principally, the bedrock consists of red sandstones, siltstones, and shales that are inter-fingered with basalt flows. Unconsolidated deposits of Quaternary age mantle the bedrock. These deposits consist of swamp muck and glacial deposits that vary in extent and thickness.

A summary of analytical results for the fifteen on-site test boring samples is as follows:

A total of seven metals ranging in concentration from 0.14 to 309 mg/kg were detected in the samples from the five test borings. Mercury was present in twelve of the test boring samples. Nine of the soil samples had concentrations of mercury ranging from 0.39 to 7.8 mg/kg which are levels above the common range of mercury in natural soils. Arsenic, the metal least abundant, was detected in only three test boring samples. The remaining metals include chromium, copper, lead, nickel, and zinc. These metals were detected in every sample analyzed and their concentrations are well within acceptable limits. However, the highest concentrations of these metals were found in the test boring samples recovered from the asbestos fill deposits. Samples recovered from the lower unit of silt/clay contained higher concentrations of lead only. Arsenic was found in most abundance in the silt/clay top fill deposit that overlies the asbestos waste materials. Low levels of organics were detected. The detected base neutral extractable compounds were restricted to one test boring sample from the topsoil fill deposit and three test boring samples from the lower silt/clay unit. Cyanide was detected in two test boring samples from the asbestos hill and from two samples recovered from the lower silt/clay unit.

Initial data collected during the remedial investigation field activities indicated that there was a possibility of instability of the asbestos pile at the Millington site. In addition sloughing of at least one area was noted. Supplemental engineering field investigations were conducted to confirm the results of the preliminary analyses which were based on a limited number of samples. Data obtained from these studies were not consistent enough to establish strength parameters for subsequent slope stability analyses. It was determined from these analyses that asbestos does not behave geotechnically in the same manner as natural soils.

At this time, it is recommended that the feasibility study be performed as outlined herein and that if required to choose a remedial action, further work will be performed. Further work could include in-situ tests that may allow for a more accurate measurement of parameters for the analysis of slope stability.

FEASIBILITY STUDY WORK PLAN

Utilizing information obtained during the Remedial Investigation, this work plan has been developed for performance of the Feasibility Study (FS) of the Millington site, i.e., incorporating a site specific hydrogeologic and geotechnicial investigation, environmental sampling and monitoring and inclusion of such objectives as the prevention of contaminant input into the environment and the mitigation of existing contamination.

The FS will identify and define the remedial action measures which could be used at the site. The study will:

- o define remedial action objectives.
- o identify and prescreen appropriate technologies and develop combinations of technologies into possible remedial action alternatives.
- o evaluate the alternatives for:
  - a. engineering concerns (can the alternative be implemented and is it reliable);
  - b. institutional concerns (does the alternative interfere with other federal, state and local requirements; and
  - c. costs (which remedial alternative is most cost effective).
- o Recommend a remedial action alternative from those developed for evaluation.

<u>Define Remedial Action Objectives (Task 1)</u>

Based on the characteristics, sources, and extent of contamination determined from the Remedial Investigation activities, response objectives will be defined. Specific objectives will be formulated to achieve compliance with applicable or relevant and appropriate requirements (ARAR's) of Federal laws and/or more stringent, promulgated state laws. A comparison of exposure point concentrations to areas are as follows:

- o Air. All air sampling results obtained during the Remedial Investigation were below the threshold limit value (TLV). Therefore, exposure point concentrations were not calculated, and cannot be compared to ARAR's.
- o Soil. The presence of contaminants in the surface and subsurface soils of this site produces the possibility of exposure via direct contact. However, there are no ARAR's for direct contact with which to compare those concentrations.

- Groundwater. Groundwater is not a significant exposure pathway at this site because no potable wells draw water from the unconfined aquifer. However, the contribution of contaminants in groundwater to the surface water pathway and the exposure point concentrations generated due in part to that contribution may exist.

- Surface Water. The surface water pathway is very important because of the proximity of the slumping and eroding waste mound to the Passaic River.

Air sampling at the site will be conducted to confirm that asbestos air concentrations are less than the TLV. Conditions at the time of sampling acted to reduce transport into the atmosphere. Air sampling during the remedial investigation was designed solely to indicate releases during potential remedial activities.

Further air sampling will be conducted to define ambient conditions. The results of all air sampling actives will be submitted as an addendum to the remedial investigation and will be considered as a part of the feasibility study.

Development of Alternatives (Task 2)

This phase of the Feasibility Study will consist of three steps. In the first, Task 2a, potential technologies will be identified that may be applicable to meet the ARAR's set for the site.

In the second step, Task 2b, these technologies will be prescreened for technical suitability based on implementability and applicability as determined by physical and chemical characteristics of the contaminant(s). The availability of performance data at this stage of the process, rather than after completion of Task 3 (Initial Screening of Remedial Alternatives), allows non-applicable technologies to be weeded out prior to incorporation into remedial action alternatives, making subsequent evaluation more focused.

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Site characteristics that may affect whether particular remedial technologies are feasible or not include:

- site volume and area
- climate and precipitation
- geologic characteristics
- soil characteristics
- slope
- surface waters
- vegetation

Waste characteristics that may limit the effectiveness of remedial technologies include:

- quantity/concentration
- chemical composition
- treatability
- persistence

In the third step, Task 2c, the technologies that passed the prescreening process will be assembled into remedial action alternatives. These alternatives will be developed to achieve results that will range from various surface controls to excavation and removal of contaminant and/or soil. A no action alternative will also be developed. These appropriate remedial technologies alternatives will be identified based on the established site objectives. These technologies alternatives will be evaluated singly and in combinations to determine how well they meet the established project objectives. One or more appropriate remedial technologies will be grouped together as required to constitute the remedial alternative.

The identification process for remedial technologies will take into account the type of media contamination, the site-specific conditions (soils, geology, etc.) public health and safety concerns, and existing EPA and NJDEP hazardous waste and related regulations.

The remedial measures listed below represent a preliminary list of options based on the existing site information. The list will be reduced or expanded, depending on the results of the site investigation. For example, if surface and groundwater monitoring do not indicate chemical contamination on-site or off-site, groundwater collection and treatment will not be required. The final list of remedial measures to be considered for all sites will be subject to approval by EPA.

The remedial technologies/remedial alternatives identified at this time include:

- Removal and Proper Disposal of Contaminated Soil. Excavating and disposing of the contaminated soil is one way to prevent additional leaching of contaminants into the groundwater and surface water. The extent of contamination and, therefore, the amount of soil to be removed was determined in the RI. The soil removed from the site will have to be transported and disposed properly. Once the contaminated soil is removed, clean fill material will be placed in the excavated areas. The site will then be graded and revegetated.

- In-Situ Vitrification. In-situ vitrification of the contaminated soil is a way to prevent additional leaching of contaminants and/or erosion or sloughing off of the current asbestos mound. This process would result in permanent on-site remedies. It is the process of turning soil into rock. On going experiments have proven very successful. Huge electrodes are inserted in the soil on each side of the contaminated zone. Graphite is used to help conduct electricity. As the high voltage of electricity passes between the electrodes, the waste and surrounding soil melt and later cool to form a block like substance similar to glass.

- Chemical Fixation - Solidification. Chemical solidification of the contaminated soil is yet another way to prevent surface water infiltration, control erosion and contain and/or stabilize the existing mound. This technology mixes waste with a binder material to enhance the physical properties of the waste and immobilize the chemical(s) of concern. More specifically, the term chemical fixation is based on the idea of chemical technology used to detoxify, immobilize, insolubilize or otherwise render a waste component less hazardous, or less capable of introducing itself into the environment.

- Consolidate Material with a Surcharge. Consolidation of the existing material with a surcharge involves applying a sufficient layer of soil or some other type of substance to the existing surface. This material is somewhat heavier than the existing material and in-turn compacts the existing material by pushing out any excess, air or water. It therefore makes the existing material tighter and more stable.

- Surface Capping. Surface capping is a remedial measure used to prevent surface water infiltration, control erosion, and isolate and contain contaminated wastes and volatiles. Natural materials, such as clay or silt, or synthetic liners constructed of materials such as PVC, butyl, or hypalon, may be used. Other surface capping techniques which may be considered in this project would include remedial measures such as roto-tilling cement and water into surface soils or borrow sources over base soil areas to fix asbestos fill materials in place. The choice of sealing material and method of application is dictated by site-specific factors, such as local availability and costs of cover material, the nature of the wastes being covered, local climate and hydrogeology, and projected future use of the site.

  The subject of location and types of borrow material required and available to implement this option are not addressed in this work plan. If this option is selected for further consideration, a modification must be made to the work plan to accommodate the locating, sampling and laboratory testing of suitable borrow material.

  Due to the nature and location of the asbestos hill at the Millington Site, this option will not be considered adequate without moderation of the existing outslopes.

- Stormwater Controls. Stormwater controls consists of surface grading (terracing, channeling or construction of ditches) and/or drainage collection facilities including storm drains, catch basins and outfalls. Stormwater controls also promote surface runoff by reducing infiltration and leachate generation, while enhancing the stability of surface cap, landforms, and other site improvements by minimizing erosion. Stormwater controls are most applicable to the north and south portions of the asbestos hill which may require stormwater collection facilities to handle runoff from steep side slopes (greater than 40 feet).

- Erosion Control. At present, the riprap at the toe of the slope at the Millington Site is insufficient to protect the asbestos pile from erosion and sloughing during a medium-to-high flood.

Erosion control systems will be examined in an effort to protect the slope from damage. Additional riprap, geotextiles, concrete mats, gibbons and other systems will be considered to prevent erosion, scouring, and undercutting of the slope. The system will be designed after a review of projected flooding in the Passaic River.

- <u>Surface and Slope Recontouring and Benching</u>. This remedial action would provide a method to stabilize the embankment by reducing the overall angle of the slope. The slope would be designed based upon the engineering properties of the pile and the in-situ soils.

- <u>Retaining Structures</u>. This alternative would provide stability to the pile through the application of a structure resistant to the movement of the slope. Concrete retaining walls, crib walls, gibbons, and other methods will be examined as buttressing alternatives for the pile.

- <u>Leachate Collection and Treatment</u>. Leachate collection systems consist of a series of drains that intercept contaminated liquid discharge from the site and channel it to a treatment facility or discharge point. Leachate treatment will be highly variable depending on the composition and strength of the leachate.

- <u>Groundwater Collection and Treatment</u>. Groundwater collection and treatment is achieved by installing recovery wells that pump groundwater from the contaminated aquifers, treating the water and returning it to the aquifer or discharging to either surface waters or POTW. As with all methods that affect groundwater conditions, extensive investigation and treatability studies are necessary to determine the appropriate implementation procedures. Surface water or POTW discharge (NJDPES) permits must also be obtained if necessary.

- <u>Construction Groundwater Barriers</u>. Groundwater barriers, constructed of bentonite slurries, cement or chemical grout, or sheet piling, can be installed vertically to (1) prevent groundwater from migrating away from the site or (2) divert groundwater so that contact with waste materials is prevented. The installation of an impermeable barrier to control groundwater flow may cause an increase to the upgradient hydraulic head, which would affect the rate of movement of groundwater. These effects must be investigated before recommendation of the groundwater barrier.

- Surface Water Collection and Treatment. Surface water collection and treatment involves collecting surface waters originating from the site and treating them on-site in sedimentation ponds connected to site drainage facilities for surface water or POTW discharge. Treatability studies must precede implementation of any surface water treatment scheme. POTW or surface water discharge will also require (NJDPES) permits.

- No Action. In all cases, as dictated by the NCP, the "no action" alternative must be considered in cost-effective analysis. The analysis must address both the environmental and financial consequences of such an alternative.

Initial Screening of Remedial Alternatives (Task 3)

The list of remedial alternatives developed during the previous phase of the Feasibility Study will be screened based on the following criteria:

- ability to meet the remedial objectives set for the site
- order of magnitude cost estimate
- reliability
- implementability
- environmental concern
- safety requirements

During this screening process, alternatives which pose substantial public health, institutional or environmental problems will be eliminated from future considerations.

Innovative technologies will be carried through the screening if it is indicated that they may offer better treatment performance or implementability, few or lesser impacts than other available approaches, or lower costs than more established demonstrated technologies.

Detailed Analysis of Remaining Alternatives (Task 4)

Alternatives that were not eliminated during the above screening process will be developed further and evaluated in greater detail to allow a comparative technical assessment.

A comparative technical assessment will be performed based on engineering, environmental, public health and economics criteria. The engineering evaluation will be based on:

- system reliability
- suitability to site specific problem
- ease of operation & maintenance
- on-site/off-site disposal requirements

The public health evaluation will be based on:

- level of protection of human health
- ability to attain ARAR's
- reduction of toxicity, mobility or volume of hazardous constituents

The environmental evaluation will be based on:

- potential adverse environmental impacts
- effectiveness
- institutional & legal constraints
- health & safety requirements

The economic viability will be based on:

- initial capital cost
- monitoring and sampling costs
- annual operation and maintenance costs

Through evaluation of short and long-term effects of each remedy, weight will be attributed to those alternatives that achieve permanent solutions to the maximum extent possible.

The output of this step in the feasibility study will yield a number of alternatives of varying cost and remediation capabilities from which the preferred method for the site can be selected.

<u>Report (Task 5)</u>

Upon completion of the study work outlined above, a feasibility study report will be prepared summarizing the technology identification and alternative evaluation activities conducted as part of the feasibility study. This report will be submitted to the National Gypsum Company for review. National Gypsum will then submit a draft copy of the report to the U.S. Environmental Protection Agency (EPA) Region II. EPA comments will be considered and will be incorporated into the report.

SCHEDULE

The feasibility study will take approximately 14 weeks to complete after notification of approval of this work plan. Completion and acceptance of the air sampling addendum to the remedial investigation will determine the beginning of the 14 week period, if the feasibility study work plan has already been approved.